

## ABSTRACT

A magnetic rotational position sensor comprises a loop pole piece, at least one magnet, and at least one magnetic flux sensitive transducers. The magnet is disposed  
5 within an air gap of the loop pole piece to establish a magnetic field through the air gap and to enclose magnetic flux within the loop pole piece. A control shaft is rotatable about a first axis and the loop pole piece and the magnet are adjoined to the control shaft to synchronously rotate the magnetic field about a second axis. A working air gap area is defined within the air gap area of the loop pole piece between a pole surface of the  
10 magnet and an inner surface of the loop pole piece. A magnetic flux sensitive transducer disposed within the air gap to sense a magnitude of magnetic flux density.

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